LONDON-WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA12 | Waddesdon and Quainton

Data appendix (AG-001-012)

Agriculture, forestry and soils

November 2013

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1 Introduction

1.1.1 The agriculture, forestry and soils appendix for the Waddesdon and Quainton community forum area (CFA12) comprise:

- soils and Agricultural Land Classification (ALC) surveys (Section 2);
- forestry (Section 3); and
- farm impact assessment summaries (Section 4).

1.1.2 Maps referred to throughout the agriculture, forestry and soils appendix are contained in the Volume 5, Agriculture, Forestry and Soils Map Book.

2 Soils and Agricultural Land Classification surveys

2.1 Background

2.1.1 The agricultural baseline data has been derived from both desk study and site investigation. Information gathered by the desk study has related primarily to the identification of soil resources in the study area, the associated physical characteristics of geology, topography and climate which underpin the assessment of agricultural land quality, and the disposition of land uses. The main sources of information have included:

- National Soil Map[1];
- Soils and Their Use in South East England[2];
- solid and superficial deposits from the Geology of Britain viewer[3];
- gridpoint meteorological data for Agricultural Land Classification of England and Wales[4];
- Provisional Agricultural Land Classification of England and Wales (1:250,000)[5];
- Likelihood of Best and Most Versatile Agricultural Land (1:250,000)[6];
- agri-environment schemes[7];
- computer-aided light detection and ranging (LiDAR) elevation data for determination of gradient; and
- aerial photography.

2.1.2 Where the collection of agricultural site information has enabled a review/refinement of published information this was undertaken in accordance with the methodology prescribed by Ministry of Agriculture, Fisheries and Food (MAFF)[8].

2.1.3 Engagement with landowners and tenants between May 2012 and June 2013 has established the nature and extent of agricultural, forestry and related rural

[1] Cranfield University (2001), *The National Soil Map of England and Wales 1:250,000 scale.*
[2] Soil Survey of England and Wales (1984), *Soils and Their Use in South East England*.
[3] British Geological Survey. http://bgs.ac.uk/geologyofbritain/home/html: Accessed on 18 March 2013
[4] Meteorological Office (1989), *Gridpoint Meteorological data for Agricultural Land Classification of England and Wales and other Climatological Investigations*.
[5] Ministry of Agriculture, Fisheries and Food (MAFF) (1983), *Agricultural Land Classification of England and Wales* (1:250,000).
[6] Department for Environment, Food and Rural Affairs (Defra) (2005), *Likelihood of Best and Most Versatile Agricultural Land* (1:250,000).
[7] Multi-Agency Geographical Information for the Countryside (MAGIC) available on line @ www.magic.gov.uk,: Accessed August 2013.
[8] MAFF (1988), *Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land*.

enterprises. Information obtained from farm impact assessment interview surveys has been taken as a factual representation of local agricultural and forestry interests and has not been subject to further evaluation.

2.2 Soils and land resources

2.2.1 The location and extent of soil types displaying different characteristics and of agricultural land in the different ALC grades are influenced by topography; drainage; geology; and soil parent material, which are described in turn below. This section then provides a description and distribution of the main soil types encountered along the study corridor.

2.2.2 The main soil and land use interactions are then evaluated and include agricultural land quality and other key soil interactions along the route within this study area.

Topography and drainage

2.2.3 The area is influenced in the south by the Midvale limestone ridge and in the north by the clay lowlands. The topography is typically gently undulating between around 70m and 80m above Ordnance Datum (AOD) although there are a few noticeable hills such as Lodge Hill near Waddesdon, Quainton Hill north of Quainton and Finemere Hill within the northern part of the area which rise to around 180m AOD.

2.2.4 There are two main watercourses, the River Ray and Muxwell Brook, both of which run east to west, together with several minor watercourses. The River Ray crosses the route between Woodlands Farm and Woodlands Farm Cottages whilst Muxwell Brook follows the boundary of Sheephouse Wood and the Calvert landfill site.

Geology and soil parent materials

2.2.5 The bedrock geology consists of the Ancholme Group and comprises a succession of different mudstones. The Ampthill, Kimmeridge, West Walton and Oxford Clay formations dominate most of the area and comprise predominantly mudstones with some localised siltstone and sandstone. The West Walton Formation is calcareous and contains limestone nodules, as does the Ampthill Clay.

2.2.6 On the hills of Waddesdon and Quainton the Wealden and Portland Group bedrock units are mapped. The Wealden Group comprises interbedded thick sandstones, siltstones, mudstones, limestones and clay ironstones while the Portland Group is comprised of sandy limestone and sandstones with localised beds of silt and clay or mudstone. The river tributaries are associated with superficial alluvial deposits, typically of silty clay material but localised sands and gravels may exist.

2.2.7 A list of geological strata occurring within the study area is provided in age order in Table 1 and shown on Map WR-02-012 (Volume 5, Water Resources Map Book).

Table 1: Bedrock and soil forming materials

Formation	Composition/soil parent material
Oxford Clay	Silicate mudstone with sporadic beds of limestone nodules
Ampthill Clay	Pale to medium grey mudstone with limestone nodules
West Walton	Calcareous mudstone, silty mudstone or siltstone with subordinate fine grained sandstones and limestone
Kimmeridge Clay	Calcareous or kerogen-rich silty or sandy mudstones with thin siltstone and cementstone beds
Portland Group	Upper part predominantly limestone and lower part predominantly sandstones and sand
Wealden Group	Interbedded thick sandstones, siltstones, mudstones, limestones and clay ironstones
Superficial deposits	
Alluvium	Compressible silty clay (silt, sand and gravel)

Description and distribution of soil types

2.2.8 The National Soil Map[1] shows the section to be dominated by slowly permeable, seasonally wet, basic loams and clays. On the hilltops of Waddesdon and Quainton there are freely draining, lime-rich loamy soils.

2.2.9 The soils mapped by the Soil Survey of England and Wales[2] are of the Denchworth, Ragdale, Evesham 2 and Aberford associations. Associated with the heavy clayey mudstone geology, the Denchworth association is the most extensively mapped soil throughout the section and is characterised by stoneless, clayey, wet and poorly drained soils of Wetness Class (WC) IV[9]. The Denchworth association is shown in Figure 1 to have developed over heavy Oxford Clay, although the depiction is not specific to the study area.

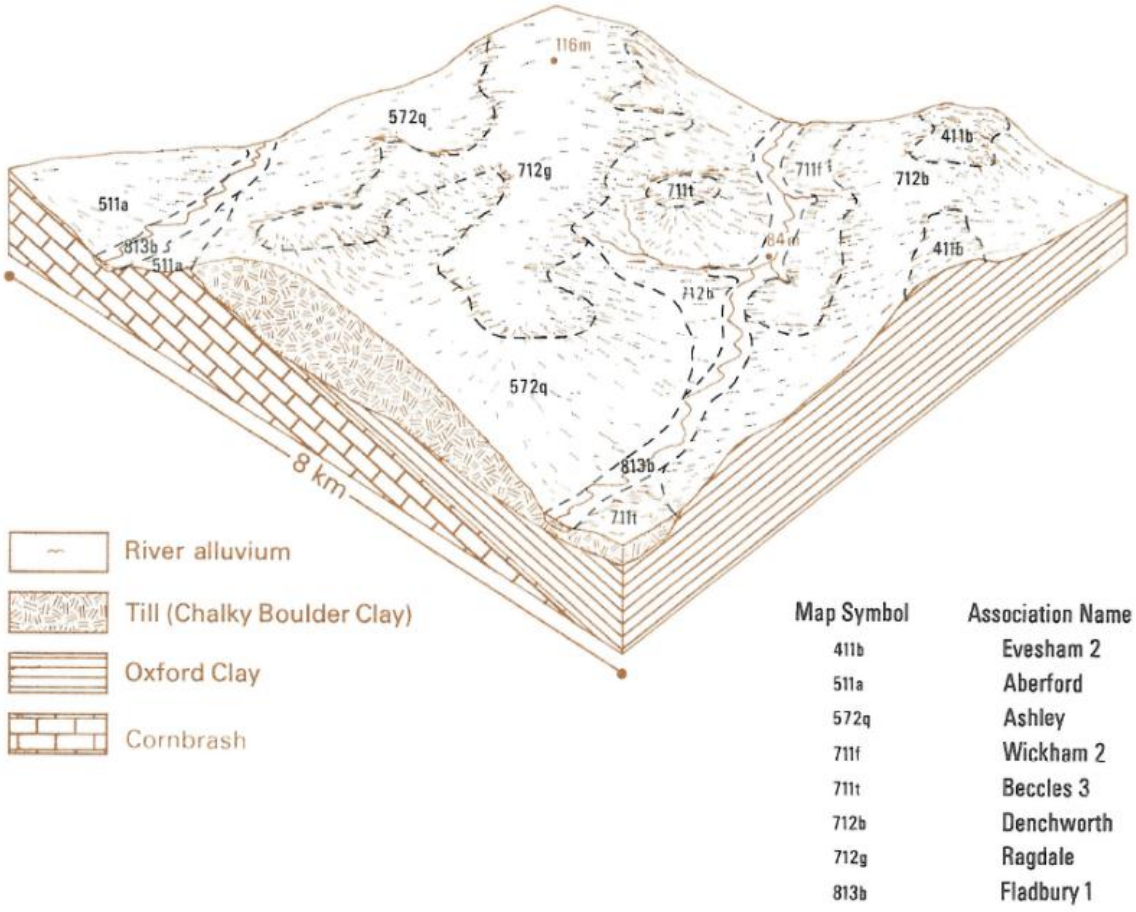
2.2.10 The Ragdale association typically develops in chalky till and comprises soils which are loamy or clayey throughout the profile. They are seasonally waterlogged and WC III or IV.

2.2.11 On the moderate slopes, moderately well drained deep clayey soils of the Evesham 2 association are present. On the steeper slopes north of Quainton and around Waddesdon, the Aberford association is mapped. Aberford soils develop over limestone and are characterised by fine loamy and well-drained soils. The soils are shown in a landscape context in Figure 1 where they are depicted occupying valley sides and hill tops.

[9] The Wetness Class of a soil is classified according to the depth and duration of waterlogging in the soil profile and has six bands.

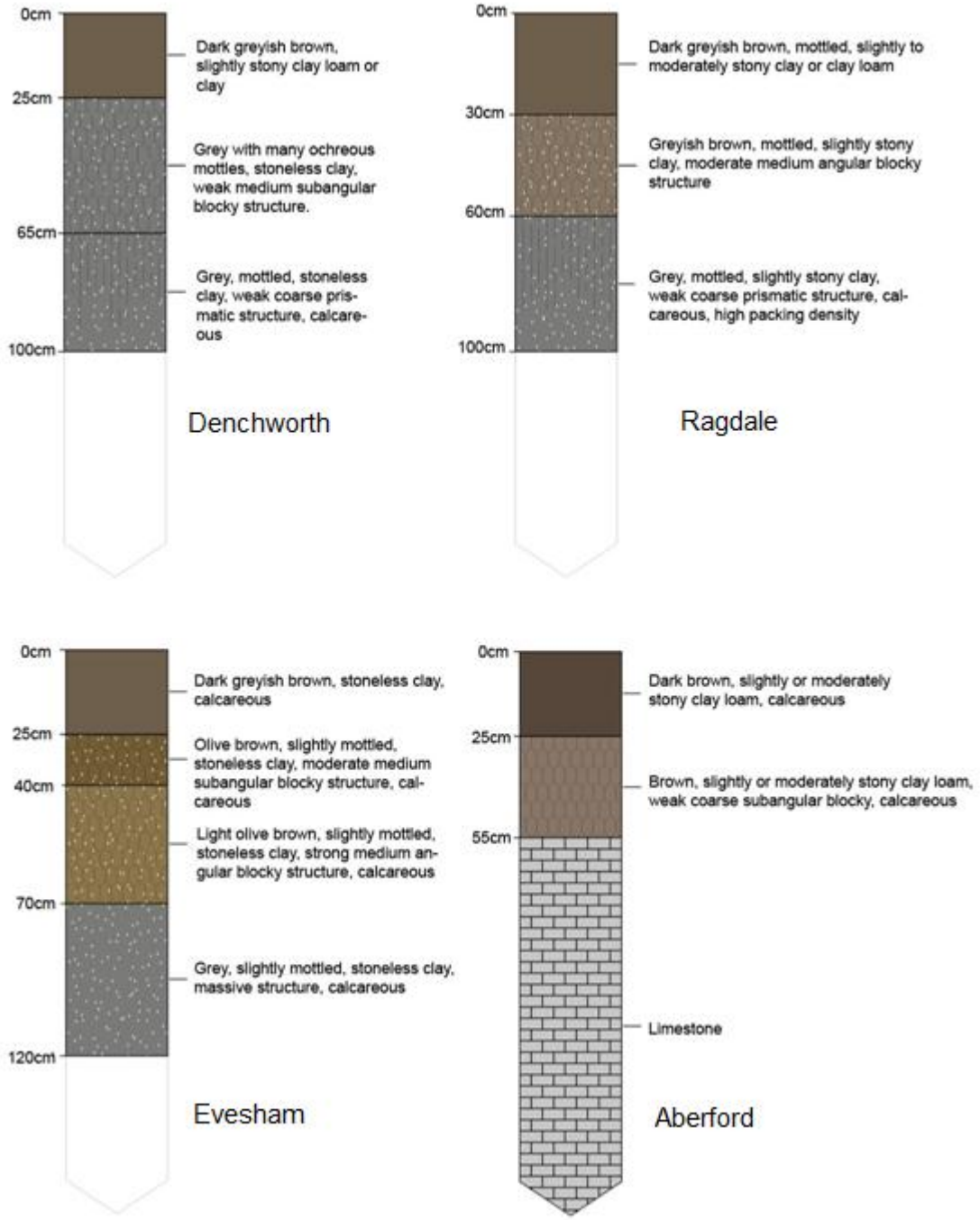
2.2.12 There are no detailed descriptions available for the predominant soil series of each association present. Typical profiles are depicted in Figure 2 alongside a basic description of each horizon, in addition to a detailed profile description of the Wickham series (Table 2) which constitutes up to 20% of the soils found in the Denchworth and Evesham 2 associations. References to soil colours have been derived from a standard Munsell Soil Colour Chart[10]. Other technical references may be found in the Soil Survey of England and Wales[2].

Figure 1: Development of the Evesham 2, Aberford, Denchworth and Ragdale soil associations in a landscape context[11]



[10] Munsell Color Charts (2000), *Munsell Color Charts*, Grand Rapids, MI, USA
[11] National Soil Resources Institute (NSRI) 2013. The Soils Guide. Cranfield University, UK Available: http://www.landis.org.uk/' Accessed August 2013.

Figure 2: Predominant soil series profile descriptions [12]



[12] National Soil Resources Institute (NSRI) 2013. The Soils Guide. Cranfield University, UK. Available: http://www.landis.org.uk/; Accessed August 2013.

Table 2: Dominant soil series

Wickham series
0cm–22cm, dark greyish brown (10YR4/2)[13] very slightly stony silty clay loam with few fine greyish brown (10YR5/2) mottles; medium subangular and tabular chert; moist; moderately developed medium subangular blocky; medium packing density; moderately firm soil strength; many very fine fibrous roots; non-calcareous; clear wavy boundary
22cm–45cm, brown (10YR5/3) slightly stony silty clay loam with many fine strong brown (7.5YR5/6) mottles; medium subrounded and tabular chert; very moist; weakly developed; adherent coarse subangular blocky with light brownish grey (2.5Y6/2) faces; medium packing density; moderately firm soil and ped strength; common very fine fibrous roots; non-calcareous; few rounded ferruginous concretions; gradual wavy boundary
45cm–65cm, light grey (5Y7/1) slightly stony silty clay with many fine strong brown (7.5YR5/8) mottles; medium subangular and tabular chert; very moist; weakly developed; adherent medium prismatic; high packing density; moderately firm soil and ped strength; few fine fibrous roots; very slightly calcareous; gradual wavy boundary
65cm–110cm, light grey to grey (5Y6/1) stoneless silty clay with many fine strong brown (7.5YR5/8) mottles; moist; weakly developed, adherent coarse prismatic; high packing density; very firm soil and ped strength; very slightly calcareous

2.3 Soil and land use interactions

Agricultural land quality

2.3.1 A review of background ALC information has been undertaken to determine the land quality context in the study area. There is no detailed post-1988 ALC data available within the Waddesdon and Quainton study area.

Desk assessment of Agricultural Land Classification

2.3.2 The study area has been subject to an intensive desk-based assessment which has relied on the interpretation of soil mapping, topography and agro-climatic data, and the interactions between each factor. This resulted in an assessment of the likely soil textures, soil drainage status, landform, gradient, presence of or depth to poorly permeable soil layers and the extent to which crop growth may be limited by soil droughtiness.

2.3.3 A professional judgement has then been made of the predominant ALC grade which is likely for a soil with the given characteristics found in the climatic zone of the location within the area. The judgement is influenced by the surveyor's experience of previous surveys in the locality and on similar soil types. The resulting grade is that which is considered to be the most likely grade that would be found should a detailed site investigation be conducted although this does not mean in all cases that that grade will be found in practice.

2.3.4 Context land quality was ascertained using information derived from the provisional ALC maps of England and Wales produced by MAFF in the 1960s and 1970s[5]. These maps show the section to be provisionally mapped as approximately equal proportions of Grade 3, good to moderate quality land and Grade 4, poor quality land.

[13] Munsell colour notation describes colour by three attributes: hue (with five principle colours - red (R), yellow (Y), green (G), blue (B), and purple (P) with a preceding intermediate value 2.5-10; value or brightness where zero is black (most dark) and ten is white (most light); and chroma that distinguishes the difference from a pure hue to a gray shade.

These maps were originally published at a scale of 1:63,360 and are available at a scale of 1:250,000 in paper and digital formats. The main limitations of these provisional maps are that they are published on strategic scales only and according to a methodology which has since been revised twice. Therefore they cannot be used to definitively classify individual sites and hence further data analysis was conducted.

Agro-climatic data

2.3.5 The local agro-climatic data have been interpolated from the Meteorological Office's standard 5km grid point data set for three locations within the area, set out in Table 3. The data show the area to be moderately warm and dry, with an average accumulated temperature range of 1,400 day°C to 1,416 day°C and average rainfall of approximately 640mm per year. The average number of field capacity days (FCD[14]) is 135 which is lower than the average for lowland England (150 days) and is considered to be favourable for providing opportunities for agricultural land working.

2.3.6 Fundamentally, climate does not in itself place any limitation upon land quality in this area but the interactions of climate with soil characteristics are important in determining the wetness and droughtiness limitations of the land.

Table 3: Interpolated agro-climatic data

Agro-climatic parameter	Waddesdon	Quainton	Greatmoor
Altitude (AOD)	90m	90m	75m
Average annual rainfall	639mm	645mm	642mm
Accumulated temperature above 0°C	1,400 day°	1,400 day°	1,416 day°
Field capacity days	133 days	135 days	136 days
Average moisture deficit, wheat	108mm	107mm	108mm
Average moisture deficit, potatoes	100mm	99mm	100mm

Site limitations

2.3.7 The assessment of site factors is primarily concerned with the way in which topography influences the use of agricultural machinery and hence the cropping potential of land. Gradient and microrelief, with complex changes of slope angle or direction over short distances, is considered to present a limitation to the grading of some areas of the section particularly to the north of Quainton and to the north-east of Finemere Wood.

2.3.8 Given the extensive network of river channels, brooks and ditches flood risk is likely to be relatively high within the study area. Flood risk is determined by the extent, duration, frequency and timing of flooding events however there is insufficient data available to downgrade ALC according to flooding.

[14] Field capacity day is a meteorological parameter which estimates the duration of the period when the soil moisture deficit is zero. Soils usually return to field capacity (zero deficit) during the autumn or early winter and the field capacity period, measured in days, ends in the spring when evapotranspiration exceeds rainfall and a moisture deficit begins to accumulate and opportunities for mechanised fieldwork are then possible.

Soil limitations

2.3.9 The main soil properties which affect the cropping potential and management requirements of land are texture, structure, depth, stoniness and chemical fertility. Together they influence the functions of soil and affect the water availability for crops, drainage, workability and trafficability.

2.3.10 There are two predominant soil types identified in the study area:

- the seasonally wet soils overlying the heavy clay geology; and
- the freely draining soils of the hilltops and slopes.

2.3.11 These characteristics are likely to result in respective limitations to the grading of soil wetness and workability, and depth and droughtiness.

Interactive limitations

2.3.12 The physical limitations which result from interactions between climate, site and soil are soil wetness, droughtiness and susceptibility to erosion. Each soil can be allocated a WC based on soil structure, evidence of waterlogging and the number of FCD. The topsoil texture then determines its ALC Grade in accordance with the MAFF ALC guidelines (Figure 3).

Figure 3: Agricultural Land Classification grade according to soil wetness[15]

Wetness Class	Texture[1] of the top 25 cm	Field Capacity Days <126	126-150	151-175	176-225	>225
	S[2] LS[3] SL SZL	1	1	1	1	2
	ZL MZCL MCL SCL	1	1	1	2	3a
I	HZCL HCL	2	2	2	3a	3b
	SC ZC C	3a(2)	3a(2)	3a	3b	3b
	S[2] LS[3] SL SZL	1	1	1	2	3a
	ZL MZCL MCL SCL	2	2	2	3a	3b
II	HZCL HCL	3a(2)	3a(2)	3a	3a	3b
	SC ZC C	3a(2)	3b(3a)	3b	3b	3b
	S[2] LS SL SZL	2	2	2	3a	3b
	ZL MZCL MCL SCL	3a(2)	3a(2)	3a	3a	3b
III	HZCL HCL	3b(3a)	3b(3a)	3b	3b	4
	SC ZC C	3b(3a)	3b(3a)	3b	4	4
	S[2] LS SL SZL	3a	3a	3a	3b	3b
	ZL MZCL MCL SCL	3b	3b	3b	3b	3b
IV	HZCL HCL	3b	3b	3b	4	4
	SC ZC C	3b	3b	3b	4	5
	S LS SL SZL	4	4	4	4	4
	ZL MZCL MCL SCL	4	4	4	4	4
V	HZCL HCL	4	4	4	4	4
	SC ZC C	4	4	4	5	5
Soils in Wetness Class VI - Grade 5						

[1]For naturally calcareous soils with more than 1% $CaCO_3$ and between 18% and 50% clay in the top 25 cm. the grade, where different from that of other soils, is shown *in brackets*

[2] Sand is not eligible for Grades 1, 2 or 3a

[3] Loamy sand is not eligible for Grade 1

Where: S = sand, Z = silt, C = clay, L = loamy and P= peat.

For sand the coarseness of the grain is sub-divided into coarse (c), medium (m) and fine (f). The subdivisions of clay loam and silty clay loam classes are indicated as medium (M) (less than 27% clay); heavy (H) (27-35% clay).

The average number of FCD in the Waddesdon and Quainton area is 135, and shown in the highlighted column.

[15] Derived from: MAFF, (1988), *Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land.*

2.3.13 Soils of the Denchworth and Ragdale associations which are developed over clay bedrock and comprise seasonally waterlogged clayey profiles of WC IV are assessed as Subgrade 3b.

2.3.14 Deep, clayey, calcareous soils of the Evesham 2 association which are assessed as WC II or III are most likely to be of Subgrade 3a.

2.3.15 The well-drained Aberford soils, with a fine loamy topsoil texture, will be limited by soil wetness to Grade 2 at worst depending upon the specific clay content of the area. The most limiting factor on these soils will be droughtiness which is impacted by soil texture, structure, depth, stone content and climatic parameters. Aberford soils are typically moderately droughty, and so a limitation to Grade 2 or 3a on droughtiness could be expected. The limitation may become more severe locally due to the possibility of increasing stoniness with depth, which itself may be limited by the underlying limestone. The calculation used to assess the severity of the droughtiness limitation is given in Figure 4.

Figure 4: Methodology for calculating the severity of a droughtiness limitation to Agricultural Land Classification grading[16]

$$\text{AP wheat (mm)} = \frac{TA_{vt} \times LT_t + \Sigma (TA_{vs} \times LT_{50}) + \Sigma (EA_{vs} \times LT_{50\text{-}120})}{10}$$

where
TA_{vt} is Total available water (TA_v) for the topsoil texture
TA_{vs} is Total available water (TA_v) for each subsoil layer
EA_{vs} is Easily available water (EA_v) for each subsoil layer
LT_t is thickness (cm) of topsoil layer
LT_{50} is thickness (cm) of each subsoil layer to 50 cm depth
$LT_{50\text{-}120}$ is thickness (cm) of each subsoil layer between 50 and 120 cm depth
Σ means 'sum of'.

$$\text{AP potatoes (mm)} = \frac{TA_{vt} \times LT_t + \Sigma (TA_{vs} \times LT_{70})}{10}$$

where
LT_{70} is thickness (cm) of each subsoil layer to 70 cm depth

MB (Wheat) = **AP** (Wheat) **- MD** (Wheat)
MB (Potatoes) = **AP** (Potatoes) **- MD** (Potatoes)

Where
MB is the Moisture Balance
AP is the Crop-adjusted available water capacity
MD is the moisture deficit, as determined by the agro-climatic assessment.

Table 8 Grade according to droughtiness

Grade/ Subgrade	Moisture Balance limits (mm) *wheat*		*potatoes*
1	+30	*and*	+10
2	+5	*and*	-10
3a	-20	*and*	-30
3b	-50	*and*	-55
4	<-50	*or*	<-55

[16] Derived from: MAFF, (1988), *Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land.*

3 Forestry

3.1.1 Data on the forestry resources in the study area has primarily been derived from the National Forest Inventory[17]. The total area of forestry land and the proportion affected by construction are given below in Table 4.

3.1.2 Substantial forestry resources occur to the north west of the Waddesdon and Quainton study area including Doddershall Wood, Grendon Wood, Finemere Wood, Runt's Wood, Balmore Wood, Sheephouse Wood and Romer Wood, all of which have received support under the English Woodland Grant Scheme which provides for the establishment, improvement and management of woodlands.

Table 4: Area of woodland within the study area and construction boundary

	Area of forestry land (ha)	**Percentage of forestry land (%)**
Forestry land in study area	445.1	11% (forestry as a land use within 4km-wide study area)
Total forestry land required for the construction and operation of the scheme	2.1	Less than 1% of the land required for the construction of the Proposed Scheme is presently wooded

[17] Forestry Commission (2001), National Forest Inventory Woodland and Ancient Woodland (as updated).

4 Assessment of effects on holdings

4.1.1 The effects on holdings have been assessed through a series of interviews with farmers along the proposed route carried out between May 2012 and June 2013, according to the methodology set out in Technical Note AG5 (within Volume 5:Appendix CT-001-000/2). Where interviews have not been possible the data has been estimated as described in the Scope and Methodology Addendum (Volume 5: Appendix CT-001-000/2).

4.1.2 The nature of impacts considered comprises the temporary and permanent land required from the holding, the temporary and permanent severance of land, the permanent loss of key farm infrastructure and the imposition of disruptive effects (particularly noise and dust) on land uses and the holding's operations. These impacts occur primarily during the construction phase of the Proposed Scheme as set out in Table 5.

Table 5: Summary of assessment of effect on holdings

Holding reference, name and description	Construction effects	Residual effects post restoration of land required temporarily
CFA12/1 Sunset Cottage 8.7ha residential with equestrian Low sensitivity to change	Land required: 1.2ha (14%). Medium impact Severance: no severance. Negligible impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft Code of Construction Practice[18] (CoCP). Negligible impact	Land required: 1.1ha (12%). Medium impact Severance: no severance. Negligible impact Infrastructure: no buildings or other farm infrastructure affected. Negligible impact
	Overall temporary assessment: minor effect	Overall permanent assessment: minor effect
CFA12/2 Waddesdon Estate 2,800ha estate, arable and livestock. Medium sensitivity to change	Land required: 75.9ha (3%). Negligible impact Severance: widely dispersed holding; no new severance. Negligible impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: 45.7ha (2%). Negligible impact Severance: widely dispersed holding; no new severance. Negligible impact Infrastructure: no buildings or other farm infrastructure affected. Negligible impact
	Overall temporary assessment: negligible effect	Overall permanent assessment: negligible effect
CFA12/3 * Wayside Farm 1.5ha residential with equestrian	Land required: < 0.1ha (1%). Negligible impact Severance: no severance. Negligible impact Disruptive effects: construction noise	Land required: < 0.1ha (1%). Negligible impact Severance: no severance. Negligible impact Infrastructure: no buildings or other

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Holding reference, name and description	Construction effects	Residual effects post restoration of land required temporarily
Low sensitivity to change	and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	farm infrastructure affected. Negligible impact
	Overall temporary assessment: negligible effect	Overall permanent assessment: negligible effect
CFA12/4 Glebe Farm 165ha, dairy cows High sensitivity to change	Land required: 44.6ha (27%). High impact Severance: access to severed land provided with accommodation structures. Low impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: 21.9ha (13%). Medium impact Severance: access to severed land provided with accommodation structures. Low impact Infrastructure: loss of slurry lagoon. High impact
	Overall temporary assessment: major/ major effect due to proportion of farm required, severance and high sensitivity of holding	Overall permanent assessment: major effect due to proportion of farm required, severance, loss of slurry lagoon and high sensitivity of holding
CFA12/5 Needles Farm 71ha beef cattle and arable farm Medium sensitivity to change	Land required: 23.6ha (33%). High impact Severance: off-lying beef unit. Unit severed but an accommodation structure will be provided to enable access on private land. Low impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: 7.3ha (10%). Medium impact Severance: access to severed land provided with accommodation structure. Low impact Infrastructure: no buildings or other farm infrastructure affected. Negligible impact
	Overall temporary assessment: major/moderate effect due to proportion of farm required, severance and medium sensitivity of holding	Overall permanent assessment: moderate effect due to proportion of farm required, severance and medium sensitivity of holding
CFA12/6 Faccenda Hatchery 6.8ha hatchery for national poultry company High sensitivity to change	Land required: 1.4ha (21%).High impact but not reliant on land for production; downgraded to: Negligible. Severance: no severance. Negligible impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: 1.2ha (18%). Medium impact but not reliant on land for production so downgraded to negligible. Severance: no severance. Negligible impact Infrastructure: no buildings or other farm infrastructure affected. Negligible impact
	Overall temporary assessment: negligible effect	Overall permanent assessment: negligible effect
CFA12/7 * Crossroads Farm, Quainton	Land required: 7.4ha (76%). High impact Severance: small area severed with no	Land required: 3.2ha (33%). High impact Severance: holding severed into three

Holding reference, name and description	Construction effects	Residual effects post restoration of land required temporarily
9.7ha grazing Low sensitivity to change	access land within parcel. High impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	parcels all accessible from public highway. Medium impact Infrastructure: no buildings or other farm infrastructure affected. Negligible impact
	Overall temporary assessment: moderate effect due to the proportion of the holding removed, severance and low sensitivity of the holding	Overall permanent assessment: moderate effect due to the proportion of the holding removed, severance and low sensitivity of the holding
CFA12/8 Fieldside Farm 64ha grazing and grass crops. Buildings let for storage Low sensitivity to change	Land required: 2.5ha (4%). Negligible impact Severance: no severance. Negligible impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: 0.9ha (1%). Negligible impact Severance: no severance. Negligible impact Infrastructure: no buildings or other farm infrastructure affected. Negligible impact
	Overall temporary assessment: negligible effect	Overall permanent assessment: negligible effect
CFA12/9 Upper South Farm 142ha beef cattle and arable unit Medium sensitivity to change	Land required: 37.6ha (26%). High impact Severance: access to off-lying beef unit presently undertaken across Grand Central railway (GCR) in future will require use of public highway. Medium impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: 28.2ha (20%). High impact Severance: access to off-lying beef unit presently undertaken across GCR railway in future will require use of public highway. Medium impact Infrastructure: Small rented field shelter demolished. High impact downgraded due to size and utility of building to low
	Overall temporary assessment: major/moderate effect due to proportion of holding required, severance and medium sensitivity of holding	Overall permanent assessment: major/moderate effect due to proportion of farm required, severance and medium sensitivity of holding
CFA12/10 Doddershall Estate 567ha beef cattle and arable Medium sensitivity to change	Land required: 43.9 (8%). Low impact Severance: access to land to the east of the Proposed Scheme will be maintained by replacing existing accommodation structures which will be constructed prior to severance. Negligible impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: 27.9ha (5%). Low impact Severance: access to land to the east of the GCR railway is afforded via an underpass that is to be maintained; therefore no new severance will occur. Negligible impact Infrastructure: Residential demolition of the Lodge. High impact

Holding reference, name and description	Construction effects	Residual effects post restoration of land required temporarily
	Overall temporary assessment: minor effect	Overall permanent assessment: major/moderate effect due to residential property demolition, the proportion of farm required, and medium sensitivity of holding
CFA12/11 Hill Farm 405ha beef cattle, sheep and arable Medium sensitivity to change	Land required: 23ha (6%). Low impact Severance: no severance. Negligible impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: 12.6ha (3%). Negligible impact Severance: no severance. Negligible impact Infrastructure: no buildings or other farm infrastructure affected. Negligible impact
	Overall temporary assessment: minor effect	Overall permanent assessment: negligible effect
CFA12/12 Crossroads Farm, Oving 75ha beef cattle Medium sensitivity to change	Land required: 4.3ha (6%). Low impact Severance: although there is severance shown on the plans by the ecological mitigation planting, access to the agricultural land to the north will be maintained. Negligible impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: 3.9ha (5%). Low impact Severance: no severance. Negligible impact Infrastructure: no buildings or other farm infrastructure affected. Negligible impact
	Overall temporary assessment: minor effect	Overall permanent assessment: minor effect
CFA12/13 Woodlands Farm 5.2ha residential with equestrian Low sensitivity to change	Land required: 0.7ha (13%).Medium impact Severance: no severance. Negligible impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: 0.7ha (13%). Medium impact Severance: no severance. Negligible impact Infrastructure: small shed demolished - impact reduced due to small scale of structure and utility. Low impact
	Overall temporary assessment: minor effect	Overall permanent assessment: minor effect
CFA12/14 Oak Tree Farm 51ha, beef cattle finishing unit. Agricultural contracting Medium sensitivity to change	Land required: 5.2ha (10%).Medium impact Severance: although there is severance shown on the plans by the ecological mitigation planting, access to the agricultural land to the north will be maintained. Negligible impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft	Land required: 3.3ha (7%). Low impact Severance: no severance. Negligible impact Infrastructure: no buildings or other farm infrastructure affected. Negligible impact

Holding reference, name and description	Construction effects	Residual effects post restoration of land required temporarily
	CoCP. Negligible impact	
	Overall temporary assessment: moderate effect due to the proportion of the holding removed	Overall permanent assessment: minor effect
CFA2/15 Woodland Farm Cottage 2 4.5ha residential with equestrian Low sensitivity to change	Land required: 2.6ha (59%). High impact Severance: no severance. Negligible impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: 1.2ha (27%). High impact Severance: no severance. Negligible impact Infrastructure: no buildings or other farm infrastructure affected. Negligible impact
	Overall temporary assessment: moderate effect due to the proportion of the holding removed and low sensitivity of holding	Overall permanent assessment: moderate effect due to the proportion of the holding removed and low sensitivity of holding
CFA2/16 * Littleton Middle Farm 108ha grazing Medium sensitivity to change	Land required: 4.6ha (4%). Negligible impact Severance: although there will be severance for a utility diversion access to the agricultural land will be maintained. Negligible impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: oha (0%). Negligible impact Severance: no severance. Negligible impact Infrastructure: no buildings or other farm infrastructure affected. Negligible impact
	Overall temporary assessment: negligible effect	Overall permanent assessment: negligible effect
CFA2/17 * 32.8ha wildlife grassland Low sensitivity to change	Land required: 7.0ha (21%). High impact Severance: although there is severance shown on the plans by the ecological mitigation planting, access to the agricultural land to the north will be maintained. Negligible impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: 3.1ha (10%). Medium impact Severance: no severance. Negligible impact Infrastructure: no buildings or other farm infrastructure affected. Negligible impact
	Overall temporary assessment: moderate effect due to the proportion of the holding removed and low sensitivity of holding	Overall permanent assessment: minor effect due to the proportion of the holding removed and low sensitivity of holding
CFA12/18 * 2ha fishery lake	Land required: 0.4ha (17%). Medium impact but no impact on fishery lake downgraded to low.	Land required: 0.3ha (15%). Medium impact but no impact on fishery lake downgraded to low

Holding reference, name and description	Construction effects	Residual effects post restoration of land required temporarily
Low sensitivity to change	Severance: access is presently made by Adam's accommodation underbridge which will be maintained. Negligible impact Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Severance: access is presently made by Adam's accommodation underbridge which will be maintained. Negligible impact Infrastructure: no buildings or other farm infrastructure affected. Negligible impact
	Overall temporary assessment: negligible effect	Overall permanent assessment: negligible effect
CFA12/19 * Briar Hill Farm 7ha grazing Low sensitivity to change	Land required: < 0.1ha (1%). Negligible impact Severance: small parcel of land (0.5ha) severed to the east of the proposed Waddesdon bypass and accessed from highway; impact downgraded due to small parcel to low Disruptive effects: construction noise and dust controlled via the mitigation measures set out within the draft CoCP. Negligible impact	Land required: < 0.1ha (1%). Negligible impact Severance: small parcel of land (0.5ha) severed to the east of the proposed Waddesdon bypass and accessed from highway; impact downgraded due to small parcel to low Infrastructure: no buildings or other farm infrastructure affected. Negligible impact
	Overall temporary assessment: negligible effect	Overall permanent assessment: negligible effect

* No farm impact assessment interview

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